

# ANNALS of CARNEGIE MUSEUM

CARNEGIE MUSEUM OF NATURAL HISTORY

4400 FORBES AVENUE • PITTSBURGH, PENNSYLVANIA 15213

VOLUME 50

8 JULY 1981

ARTICLE 7

## A REVIEW OF THE CUBAN MEMBERS OF THE GENUS *ARRHYTON* (REPTILIA, SERPENTES, COLUBRIDAE)

ALBERT SCHWARTZ<sup>1</sup>

Research Associate, Section of Amphibians and Reptiles

ORLANDO H. GARRIDO<sup>2</sup>

### ABSTRACT

Cuban colubrid snakes of the genus *Arrhyton* are shown to belong to six species, of which two (*A. ainictum* from Camagüey Province and *A. tanyplectum* from Pinar del Río Province) are named herein. A phyletic sequence among the species is suggested, and data are presented on the characteristics and ecology (insofar as known) of all species.

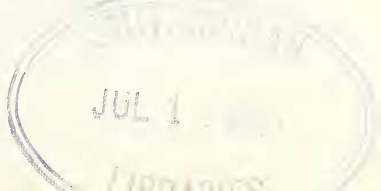
### INTRODUCTION

The last reviser (Schwartz, 1965) recognized three Cuban species—*Arrhyton taeniatum* Günther, *A. dolichurum* Werner, *A. vittatum* Gundlach and Peters—of the (then considered) endemic colubrid genus *Arrhyton*. He also named *A. v. landoi* as a new subspecies. Two more recent works have changed the nomenclatural situation as far as *Arrhyton* is concerned—1) Maglio (1970) included Jamaican and Puerto Rico taxa in his expanded definition of the genus, although we are not convinced that his inclusion of extra-Cuban species within *Arrhyton* is correct, that biological and nomenclatural problem does not concern us directly

<sup>1</sup> Miami-Dade Community College, North Campus, Miami, FL 33167.

<sup>2</sup> Instituto de Zoología, Academia de Ciencias de Cuba, La Habana, Cuba.

Submitted 15 December 1980.



in the present context; 2) Lando and Williams (1969) raised *landoi* to specific (rather than subspecific) rank, based primarily on the lower tooth counts of *A. landoi* in respect to *A. vittatum*. Schwartz and Thomas (1975) continued, however, to consider *landoi* as a subspecies of *A. vittatum*. They also reported a specimen of *A. v. landoi* from Francisco in Camagüey Province; all previous records had been from the southern coastal regions of Oriente Province, and the Camagüey record stood alone geographically. It was also significant in another context—the specific or subspecific status of *landoi* is in part contingent upon whether it is sympatric with *A. vittatum*. The Francisco specimen suggests that this is the case, although there are no *A. vittatum* from intermediate localities nor have the two taxa been taken syntopically.

The present review stems from the facts that the junior author has collected many additional *Arrhyton*, and that material, deposited in other Cuban collections, has been gathered together in the Instituto de Zoología. These specimens were in turn sent to the senior author who had assembled most of the specimens in North American collections. Thus we have had available for study (or scale counts and measurements) a total of 158 specimens of Cuban *Arrhyton*. Schwartz (1965) studied a total of 75 specimens; the number available to us has more than doubled. Although there are still puzzles remaining within Cuban *Arrhyton*, and there are huge hiatuses in the known distributions of several of the species, the added material has clarified certain problems. We discuss the taxa in the order proposed by Lando and Williams (1969), who suggested that *vittatum* is the most primitive, *taeniatum* the most specialized, and that *landoi* and *dolichurum* are intermediate. This sequence does not violate our own concepts; even though we have named new taxa in the present paper, they fall naturally into this sequence. In fact, the Cuban members of the genus would seem to fall naturally into three groups; this division will be discussed later in this paper.

#### TAXONOMIC ACCOUNTS

##### *Arrhyton vittatum* Gundlach and Peters

*Cryptodacus vittatus* Gundlach and Peters, 1862, Monatsb. Akad. wiss. Berlin, p. 1003.

*Type-locality*: Cárdenas, Matanzas Province, Cuba. *Holotype*: ZMB (Museum für Naturkunde, Humboldt-Universität, Berlin, D.D.R.) 4096 (not examined by authors).

*Arrhyton bivittatum* Cope, 1863, Proc. Acad. Nat. Sci. Philadelphia, 14:82. *Type-locality*: Cuba. *Holotype*: USNM 5784 (examined by authors).

*Arrhyton vittatum*: Boulenger, 1894, Cat. Snakes British Mus., 2:252.

*Carpodacus vittatus* Schwartz, 1965, Proc. Biol. Soc. Washington, 78:105 (*in errore*).

*Definition*.—A small (males to 194 mm, females to 207 mm snout-vent lengths), usually distinctly lined, non-glossy or iridescent, snake

without a distinctly upturned rostral, ventrals 107 to 123 in males, 108 to 122 in females; subcaudals paired, 52 to 76 in males, 52 to 81 in females; head neither conspicuously flattened nor broad; dorsal pattern a series of three dark brown longitudinal lines, the most lateral of which lie on scale rows 3 and 4 (occasionally on 2 to 5) and are much darker than the median line (see Fig. 3 for all dorsal body pattern); lined pattern not less pronounced in juveniles than in adults; ventral color dull cream in preservative and white to pale pinkish in life; ratio of tail/total length  $\times 100$ , 28.3 to 36.6 in all males (regardless of size), 28.8 to 38.4 in all females; loreal present, usually single bilaterally, occasionally 1/2 or 2/2; prefrontals usually two, occasionally one; dorsal cephalic pattern a dark (brown) blotch whose margins are ill-defined and not outlined distinctly with white (see Fig. 2 for all dorsal head patterns), involving the scutes posterior to the prefrontals and extending to the edges of the parietals, or beyond onto the anteriormost body scales; median brown dorsal line (which usually involves the median and two paramedian dorsal scale rows) begins at the posterior edge of the cap and is usually joined to it; a brown loreal line extends from the naris through the eye and temporals, and thence along scale rows 3 and 4 (usually), the temporal portion of this line distinct and separate from the brown cap by a pale line which extends from the posterior margin of the eye more or less along the outer edges of the parietals; of the three dorsal lines, the lateral pair is often much darker than the median line, which may be very faint or even barely discernible; in smaller individuals, the first two rows of dorsal scales may be almost as dark as the lateral line, so that its lower margin is less distinct than in adults; some brown stippling or suffusion on the infralabials and the chin in general; scale rows usually 17-17-17, supralabials usually 7/7, infralabials usually 9/9 (but see Variation below); one preocular and two postoculars on each side.

*Variation.*—We have grouped together the series of *A. vittatum* into four geographic samples from west to east as follow: 1) I-PR—Isla de Pinos, Pinar del Río (12 specimens); 2) H-M—Habana-Matanzas (30); 3) V-C—Las Villas-Camagüey (18); 4) NO—northern Oriente (5). Some scale data on these samples are given in Table 1. The largest male (IZ 5595) has a snout-vent length of 194 (all measurements in millimeters) and is from Pinar del Río Province; a male from Matanzas Province (MFP 534) is only very slightly smaller with a snout-vent length of 193. The longest female (ASFS V50459) has a snout-vent length of 207 and is from Habana Province; no other female approaches this one in length. Taking the entire lot into consideration, western specimens seem to be longer than eastern snakes; the sample from NO, however, contains only five specimens. Still, the much larger V-C series (18 specimens) does not include any extremely large individuals. Ventral scales in males have means between 112.9 (H-M) and 117.7 (NO), with a range of 107 to 123 (both H-M sample). Ventral means in females range between 111.6 (H-M) and 116.8 (V-C), with a range of 108 (H-M) to 120 (H-M, V-C). Male subcaudal means vary between 64.6 (V-C) and 70.4 (I-PR), with a range of 52 (V-C) to 76 (I-PR). Female subcaudal means vary between 59.0 (V-C) to 76.0 (I-PR), with a range of 52 (V-C) to 81 (I-PR). Means of total underbody scales

Table 1.—Scale counts and ratios of six species of Cuban Arrhyton; means and extremes by sex are shown.

Taxon	Sex	N	Ventrals	Subcaudals	Total underbody scales	Tail/total length × 100
<i>Arrhyton vittatum</i>						
Isla de Pinos-Pinar del Río	♂	7	116.3 (111-122)	70.4 (62-76)	186.6 (173-198)	33.7 (32.1-35.3)
	♀	4	112.3 (111-115)	76.0 (70-81)	188.3 (181-195)	36.6 (34.2-38.4)
Habana-Matanzas	♂	14	112.9 (107-123)	65.8 (61-73)	174.8 (171-193)	32.7 (29.0-35.7)
	♀	7	111.6 (108-120)	60.2 (55-67)	172.4 (165-187)	30.9 (29.2-33.0)
Las Villas-Camagüey	♂	12	117.1 (110-122)	64.6 (52-71)	180.8 (155-192)	32.0 (28.3-34.6)
	♀	4	116.8 (112-120)	59.0 (52-66)	175.8 (166-184)	30.4 (28.8-32.1)
Northern Oriente	♂	3	117.7 (116-119)	69.0 (64-75)	186.7 (182-191)	33.5 (30.3-36.6)
	♀	2	116.0 (115-117)	66.5 (64-69)	182.5 (179-186)	32.4 (31.9-32.9)
<i>Arrhyton landoi</i>	♂	20	127.6 (118-150)	83.9 (71-111)	211.8 (191-252)	35.0 (30.7-40.1)
	♀	12	127.9 (115-141)	83.0 (69-96)	210.1 (184-237)	34.1 (32.4-36.3)
<i>Arrhyton ainictum</i>	♂	1	137	108	245	32.7
<i>Arrhyton dolichura</i>	♂	7	128.9 (127-132)	116.4 (101-127)	245.0 (232-254)	42.7 (40.4-45.8)
	♀	5	126.6 (123-132)	111.8 (104-127)	238.0 (229-252)	41.2 (39.6-44.4)
<i>Arrhyton tanyplectum</i>	♂	2	145.5 (145-146)	132.5 (132-133)	278.0 (277-279)	42.7 (41.9-43.5)
	♀	1	141	121	262	41.4
<i>Arrhyton taeniatum</i>	♂	19	178.0 (168-187)	87.1 (73-99)	264.8 (249-278)	25.7 (22.0-28.3)
	♀	19	180.2 (173-189)	89.6 (76-105)	284.6 (251-292)	24.9 (18.4-29.5)

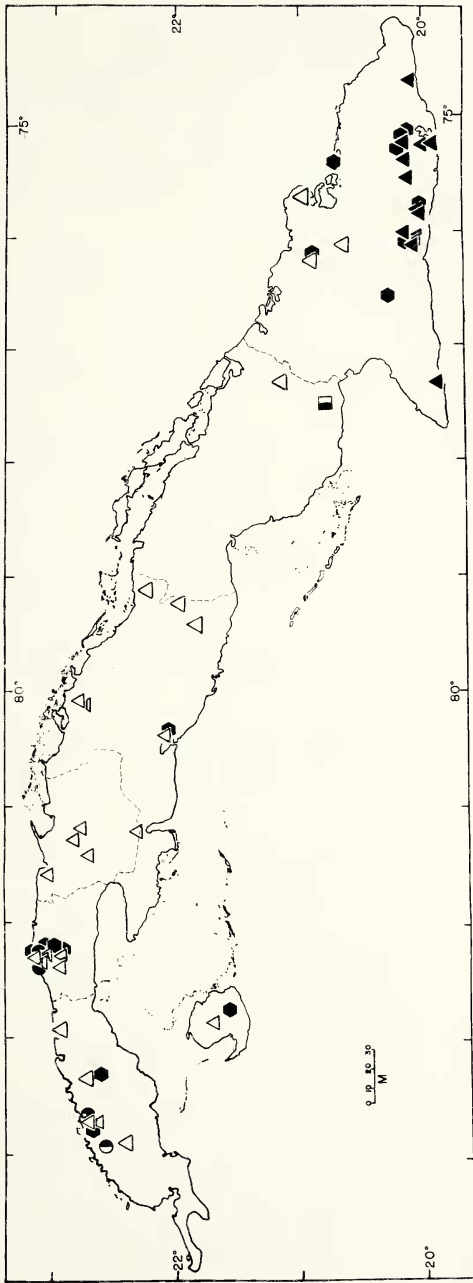


Fig. 1.—Map of Cuba, showing the known distributions of six species of *Arrhyton*, as follow: *vittatum*, hollow triangles; *landol*, solid triangles; *aninctum*, semi-solid square; *dolichura*, solid circles; *tanyplectum*, semisolid circles; *taeniatum*, solid hexagons. In some cases, adjacent localities have been combined for greater clarity.

(ventrals + subcaudals) in males vary between 174.8 (H-M) and 186.7 (NO), with a range of 155 (V-C) to 198 (I-PR). Total underbody scales in females have means between 172.4 (H-M) and 188.3 (I-PR); the range is 165 (H-M) to 195 (I-PR). Tail/total length ratios  $\times 100$  means in males vary between 32.0 (V-C) and 33.7 (I-PR), with a range of 28.3 (V-C) to 36.6 (NO). The same ratio means in females vary between 30.4 (V-C) and 36.6 (I-PR), with a total range of 28.8 to 32.1 (both V-C). In general, western (I-PR) specimens have somewhat higher scale counts; the trend is most obvious in subcaudal scales. Central specimens (H-M) in general have low counts, whereas specimens from Las Villas eastward have higher counts once again. There are no significant differences in tail/total length ratios from west to east.

Supralabials are usually 7/7, with only one of 61 specimens with a count of 7/8. Infralabials are modally 9/9 (22 specimens), with other counts of 8/8 (19), 6/7 (one), 7/8 (four), and 8/9 (10). The incidence of 9/9 is highest in NO (three of five specimens = 60%) and in H-M (12 of 25 specimens = 48%); no I-PR specimen has a count of 9/9. Prefrontals are usually two, but two specimens from H-M and one from NO have one prefrontal. One loreal is usually present on each side, but one specimen from H-M has 2/2 and another from V-C has 1/2. Preoculars are 1/1 in all but one specimen (V-C) with 1/2. Postoculars are usually 2/2 except for one specimen (H-M) with a count of 1/2. The lateral stripe is usually on scale rows 3 and 4, but one specimen (H-M) has the lateral stripes on rows 2-5. Most specimens have a dorsal scale row formula of 17-17-17, but other counts include 18-17-17 (four specimens), 19-17-17 (four), 15-17-17 (two), and 18-18-17 (one).

Lando and Williams (1969) gave the following tooth counts for seven *A. vittatum*: dentary, 15-17; maxilla, 12-15 + 2; pterygoid, 9-10; palatine, 10-15.

**Distribution.**—Islandwide on Cuba and the Isla de Pinos, except for the southern coast (south of the Sierra Maestra and the Sierra de Purial and its affiliates) in Oriente Province (see Fig. 1 for distributions of all species).

**Remarks.**—Very little information is available upon the habits or habitats of *A. vittatum*. One specimen (AMNH 77780) was taken crossing a dry road through semi-xeric forest during the day, and another (IZ 5108) was found under a rock. We assume that the species is cryptic, but may be active during the day as well as at night.

**Specimens examined.**—ISLA DE PINOS: no further locality (MCZ 12446-47). PINAR DEL RIO PROV.: Valle de Pica Pica, Sumidero (IZ 5596); mountains N San Vicente (AMNH 77780); Viñales (MFP 263); Loma de Taburete, Sierra del Rosario (not mapped) (IZ 5108); Sierra del Rosario (IZ 5716); Cabañas (IZ 5580-83); Cafetal El Liberal, Cabañas (IZ 5595). HABANA PROV.: La Habana (USNM 93929); Vedado, La Habana (MCZ 44404); Reparto El Moro, La Habana (IZ 5605); Atabey, Marianao (ASFS V50456-60, IZ 4709); El Cotorro (AMNH 46723-28 + 1 unnumbered MFP); Jacomino (not mapped) (MFP 527); Valle de Lawton (not mapped) (IZ 5576); Chávez (IZ 5624); Santiago de la Vegas (IZ 3631, IZ 4648-49); Cojimar (MCZ 12362); no locality other than "Cuba" (USNM 5784—holotype of *bivittatum*). MATANZAS PROV.: Matanzas (USNM 103627); Finca S. Matías, 9.5 km from Matanzas (MFP 534); J. G. Gómez, Bolondrón (IZ 5607); Finca Rueda, Jovellanos (IZ 1994); San Miguel de los Baños (IZ 3724); Río Harábana, Ciénaga de Zapata (MCZ 10846). LAS VILLAS PROV.: San Felipe, Arroyo Blanco (IZ 3045); Soledad, Cienfuegos (MCZ 7925, MCZ 12358, MCZ 22712, MCZ 32676, MCZ 34259-60); Sancti Spiritus (ANSP 15909); Sierra de Jatibonico (MCZ 7951); Sagua la Grande (IZ 1074); Sitiecito, Sagua la Grande (MFP 184). CAMAGÜEY PROV.: Martí (UMMZ 70889-93, UMMZ 72404-05). ORIENTE PROV.: Banes (UMMZ 139742-44); San Germán (MFP 212); Holguín (IZ 5578).

*Arrhyton landoi* Schwartz

*Arrhyton vittatum landoi* Schwartz, 1965, Proc. Biol. Soc. Washington, 78:109. *Type-locality*: mountains north of Imías, Oriente Province, Cuba. *Holotype*: MCZ 42505 (examined by authors).

*Arrhyton landoi*: Lando and Williams, 1969, Stud. Fauna Curaçao and Carib. Is., 31:194.

*Definition*.—A moderate-sized (males to 238 mm, females to 250 mm snout-vent lengths), boldly to faintly longitudinally lined, non-glossy or iridescent snake without a distinctly upturned rostral, ventrals 118 to 150 in males, 115 to 141 in females; subcaudals paired, 71 to 111 in males, 69 to 96 in females (one female with an incomplete tail has 117 subcaudals); head neither conspicuously flattened nor broad; dorsal pattern a series of three dark (in juveniles) to rather faint (in adults) brownish longitudinal lines, the most lateral of which lie on scale rows 3 and 4 (occasionally on 4 only); venter dull cream in preservative and pink to grayish or cream in life; ratio of tail/total length  $\times 100$ , 30.7 to 40.1 in all males, 32.4 to 36.3 in all females; loreal present, usually bilaterally single, two specimens with 1/2 loreals; prefrontals one or two; dorsal cephalic pattern a clearly defined and delimited dark brown cap, its center lighter than its periphery, surrounded by a pale tan figure from the posterior border of the parietals through and above the eye onto the prefrontals; a brown (but paler centrally) stripe across the lores and through the eye and across the temporals and continuing as the lateral stripe on the body; infralabials (and often supralabials) and chin rather heavily stippled with brown; scale rows usually 17-17-17; supralabials usually 7/7, infralabials usually 9/9 (see Variation below); usually one preocular and two postoculars on each side.

*Variation*.—We have examined 33 specimens of *A. landoi* from the southern Oriente coast. The longest male (ASFS V6233) has a snout-vent length of 238, the longest female (ASFS V6234) 250; both are from the United States Naval Base. Scale data are presented in Table 1. Supralabials are usually 7/7 (28 specimens), but other counts include 7/8 (three), 8/8 (one), and 6/9 (one); infralabials are usually 9/9 (26), but other counts include 8/8 (three), 9/10 (two), and 8/10 (one). Prefrontals are two in 20 specimens, single in 11. Loreals are bilaterally one, with two specimens having 1/2 loreals. Preoculars are 1/1 in all specimens. Postoculars are 2/2 in 31 specimens, 1/2 in one specimen. The lateral stripe is usually on scale rows 3 and 4 (28 specimens) but two individuals have a narrow lateral line on scale row 4 only. Dorsal scale rows are usually 17-17-17 (28 specimens), with other counts of 16-17-17 (one), 18-17-17 (one), and 19-17-17 (one).

The distinctive dark brown cap, clearly outlined anteriorly and laterally with pale tan, is characteristic of all young and most adult specimens; however, there is a tendency for older individuals to have the edges of the cap more fragmented and less distinct than in young individuals. The intensity of the three body stripes, as well as the width of the middorsal stripe, are also variable. In general, the clarity of the stripes decreases with increasing size. The middorsal stripe may be broad and conspicuous or quite narrow and relatively inconspicuous. In some specimens (IZ 5592) the cephalic cap is followed by a pair of (presently) very pale spots, almost forming a pale nuchal band, bisected by the connection of the dark middorsal stripe with the dark head figure. Some other smaller

specimens have a pair of pale blotches in this same area, whereas others lack it. Lando and Williams (1969) recorded the dorsum of a specimen in life of *A. landoi* as reddish brown with black middorsal stripe; lower surface cream, chin white (U.S. Naval Base specimen).

Lando and Williams (1969) gave the following tooth counts for three specimens of *A. landoi*: dentary, 14–15; maxilla, 10–11 + 2; pterygoid, 9; palatine, 9.

*Comparisons.*—The fact that *A. landoi* was first named as a subspecies of *A. vittatum* suggests that these two taxa are indeed similar. They are also geographic replacements, because *A. vittatum* is unknown from within the southern Oriente range of *A. landoi*. The single presumed *A. landoi* from Francisco, Camagüey Province, reported by Thomas and Schwartz (1975), we now feel represents another taxon, so that *A. landoi* is not known to occur within the range of *A. vittatum* to the north and west.

Aside from the dental differences noted by Lando and Williams (1969), the two species differ in size and scutellation. *Arrhyton landoi* is much the larger snake, with maximum snout-vent lengths in males of 238 and in females of 250, in contrast to a male maximum of 194 and female maximum of 207 in *A. vittatum* (both large specimens are from western Cuba in Pinar de Río and Habana provinces); most *A. vittatum* are much smaller than these two maximally sized individuals. Ventrals in male *A. landoi* are 118 to 150 (mean = 127.6), in females 115 to 140 (127.9); male *A. vittatum* have 107 to 123 ventrals (means by sample between 112.9 and 117.7) and females have 108 to 120 ventrals (means by sample between 111.6 and 116.8). Although there is some overlap between these counts in *A. landoi* and *A. vittatum*, it is minimal, and *A. landoi* have more ventrals than do *A. vittatum*.

Subcaudal scales show the same situation. In *A. landoi* males, subcaudals vary between 71 and 111 (mean = 83.9), in females between 69 and 96 (83.0); one female has an incomplete tail with 117+ subcaudals. In *A. vittatum*, males have subcaudals between 52 and 76 (means by sample between 64.6 and 70.4, the high mean from the Isla de Pinos-Pinar del Río sample), and females between 52 and 81 (means by sample between 59.0 and 76.0, the high mean again from western specimens).

Total underbody scales repeat the same phenomenon. Male *A. landoi* have 191 to 252 underbody scales, females 184 to 237 (the female with an incomplete tail has 239+). Male *A. vittatum* have between 155 and 198 underbody scales (means by sample between 174.8 and 186.7) and females between 165 and 195 (means by sample between 172.4 and 188.3). Tail/total length ratios  $\times 100$  in male *A. landoi* are 30.7 to 40.1 (mean = 35.0), in females 32.4 to 36.3 (34.1). This ratio in male *A. vittatum* varies between 28.3 and 36.6 (means by sample between 32.0 and 33.7), in females between 28.8 and 38.4 (means by sample between 30.4 and 36.6).



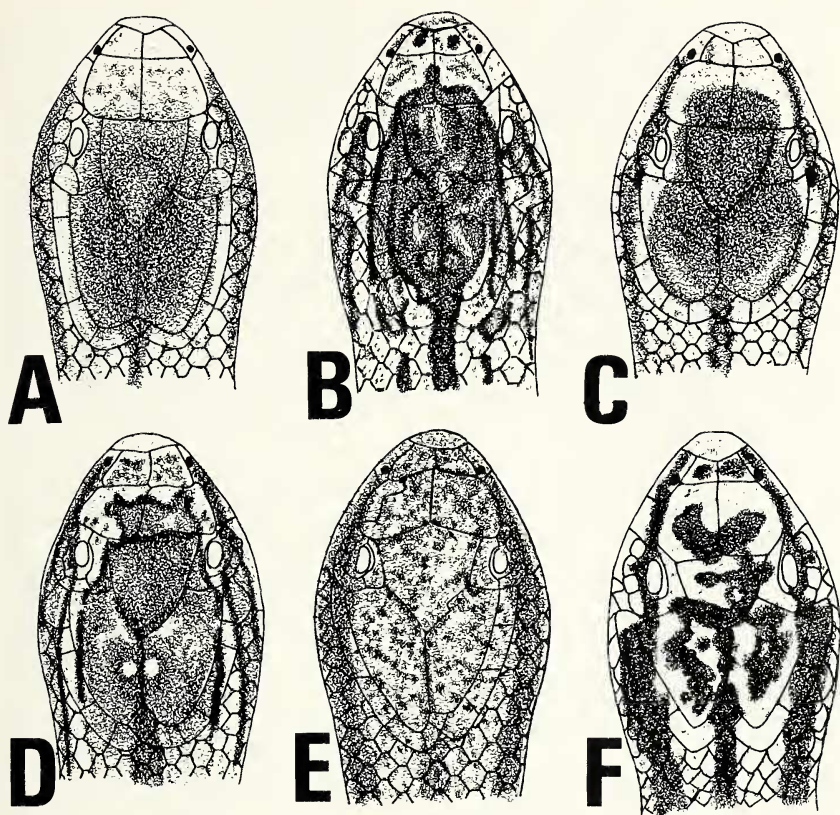


Fig. 2.—Dorsal views of heads of six species of *Arrhyton*, as follow: A, *vittatum* (AMNH 46727); B, *landoi* (USNM 139743); C, *ainictum* (IZ 4256—holotype); D, *dolichura* (IZ 1046); E, *tanyplectum* (AMNH 77782—holotype); F, *taeniatum* (IZ 5575).

The high incidence of one prefrontal in *A. landoi* (12 of 32 specimens, 38%) is noteworthy in comparison with *A. vittatum* (four of 52, 8%). All other scale counts are comparable.

*Distribution.*—The southern coast of Oriente Province and associated mountain ranges, from the Ensenada de Mora in the west to the mountains north of Imías in the east.

*Remarks.*—Schwartz (1965) noted the collection by Richard Thomas of a pair (ASFS V6233–34) of *A. landoi* on the U.S. Naval Base; they were secured in a rotting mat of palm fibers about the base of a fan palm in a palm thicket on a xeric scrubby hillside. Lando and Williams (1969) recorded one snake (MCZ 68728) as found under a stone about 6 inches below the ground surface; when exposed, the snake burrowed

actively into the loose soil and rocks. A second specimen (MCZ 68943) was found on soil (under a rock?) and used the same escape tactics. Tolson took an adult male (ASFS V15036) in a wooded area under a large sheet of plywood almost completely concealed under leaf mold and debris.

*Specimens examined.*—ORIENTE PROV.: Ensenada de Mora, Pílon (AMNH 36703–04); 6.5 km S Palma Soriano (AMNH 83584); Cobre Range, Sierra Maestra (MCZ 42547); Río Frío, El Cobre (IZ 5628, IZ 5638); near Loma del Gato, Hongolosongo (IZ 5625); Santiago de Cuba (AMNH 2949, IZ 5577); Colonia España, Santiago de Cuba (UIMNH 49303); Cueva de Mamoncillo, Santiago de Cuba (IZ 5134); Playa Damajayabo, 2 km from Santiago de Cuba (IZ 5636); Vista Alegre (IZ 5600–01, IZ 5626, IZ 5635, IZ 5638); Santa María de Loreto, Ti Arriba (IZ 5629); Guantánamo (IZ 5602, IZ 5606); Soledad Estate, Guantánamo (IZ 5592); Río Guantánamo (IZ 5627); Tiguabos (IZ 5662); Las Pailas (IZ 5593); United States Naval Base, Guantanamo Bay—various localities (ASFS V6233–34, ASFS V15036, MCZ 141580, MCZ 58724, MCZ 68943, UIMNH 49301–02); mountains N Imías (MCZ 42505—holotype).

*Arrhyton ainictum*, new species

*Holotype.*—IZ 4256, an adult male, from Cueva del 18, Francisco, Camagüey Province, Cuba, taken 30 July 1974 by Lorenzo Zayas.

*Definition.*—A large (male holotype and only known specimen 363 mm snout-vent length), rather faintly longitudinally lined snake without a distinctly upturned rostral, ventrals 137, subcaudals paired, 108; head neither conspicuously flattened nor broad; basic dorsal pattern a series of three longitudinal lines, the lateral pair faint, the median dorsal line even fainter and diffuse, the lateral lines on scale rows 3 and 4; venter cream in preservative, presumably white in life; ratio of tail/total length  $\times 100$ , 32.7; loreals asymmetrical, 1/2; prefrontals two; dorsal cephalic pattern a brown cap, not appreciably lighter centrally, sharply defined marginally and extending from the prefrontals onto the parietals and joining the extreme dark anterior portion of the median body line which within a short distance becomes faint and diffuse; a pair of paramedian tan blotches, darker than the central pale tan dorsal ground color, separated from the cap; a dark brown loreal line from the nares anteriorly around the snout and posteriorly to the eye, thence posteriorly to form the anterior portion of the lateral stripes which become faint a short distance posteriorly; between the median dorsal and lateral stripes on each side is another faintly indicated longitudinal stripe on scale rows 6 and 7, so that the net effect is a quinquelineate (rather than trilineate) snake; dorsum (as preserved) pale tan, dorsal scale rows (1 to lower half of 3 below lateral lines) white and concolor with venter; dorsal scales generally with dark bases, this dark pigment more extensive posteriorly, giving the tail a "braided" look.

*Variation.*—Other than the measurements and counts given in the definition, counts on the holotype are: supralabials, 7/7; infralabials, 8/8; 1/1 preoculars; 2/3 post-

oculars; total length, 589, tail length, 176; scale rows, 17-17-17; total underbody scales, 245.

*Comparisons.*—*Arrhyton ainictum* is easily distinguished from *A. vittatum* by its much larger size (maximally sized male *A. vittatum* 194 mm snout-vent length), greater number of ventrals (137 versus a maximum of 122 in *A. vittatum* males), the clearly defined cephalic cap, and the quinquelineate pattern.

Because the holotype of *A. ainictum* has previously been reported (Schwartz and Thomas, 1975) as *A. v. landoi* (= *A. landoi* in our present usage), it is obvious that the most pertinent comparisons are with that taxon. The two species differ from each other in a number of ways, although we admit to a close relationship between them. *Arrhyton ainictum* is the larger snake (largest male *A. landoi* 250 snout-vent length); ventral and subcaudal counts in *A. ainictum* fall within the ranges of these counts in *A. landoi* but near the upper extremes. Total underbody counts show the same situation (245 in *A. ainictum*, 191 to 252 in *A. landoi* males); ratio of tail/total length (32.7) likewise falls within the range of *A. landoi* males (30.7 to 40.1), but toward the lower extreme. Although 2/3 postoculars is likely a peculiar aberration in the holotype, it is not known to occur in *A. landoi*, which modally has 2/2 postoculars. However, no *A. landoi* has a quinquelineate pattern as does *A. ainictum*, and the cephalic patterns, although similar, are not identical. In large adult *A. landoi* (which are invariably smaller than the holotype of *A. ainictum*), the cephalic cap tends to become less sharply defined, whereas in *A. ainictum* the cap is quite sharply delimited and is not strikingly paler centrally as is the case in *A. landoi*.

*Distribution.*—Known only from the type-locality.

*Remarks.*—Considering the history of the nomenclature of Cuban *Arrhyton*, we may seem foolhardy to name a new species of the genus on the basis of one specimen. We have little doubt that *A. ainictum* is distinct but its level of distinctness is in dispute. It might indeed more properly be regarded as a western subspecies of *A. landoi* (in which case its locality is removed some 125 airline km and across the large Golfo de Guacanayabo) from the nearest *A. landoi* locality (Ensenada de Mora, Pilón). The intervening land area includes the low-lying and mesic Valle Central, through which the large Río Cauto flows westward into the Golfo de Guacanayabo. Most of western Oriente and all of Camagüey provinces are unknown as far as *Arrhyton* are concerned; specimens from this region are from areas far removed (Holguín, San Germán, Banes), with the exception of a series of unquestioned *A. vittatum* from Martí, 45 km N of Fran-

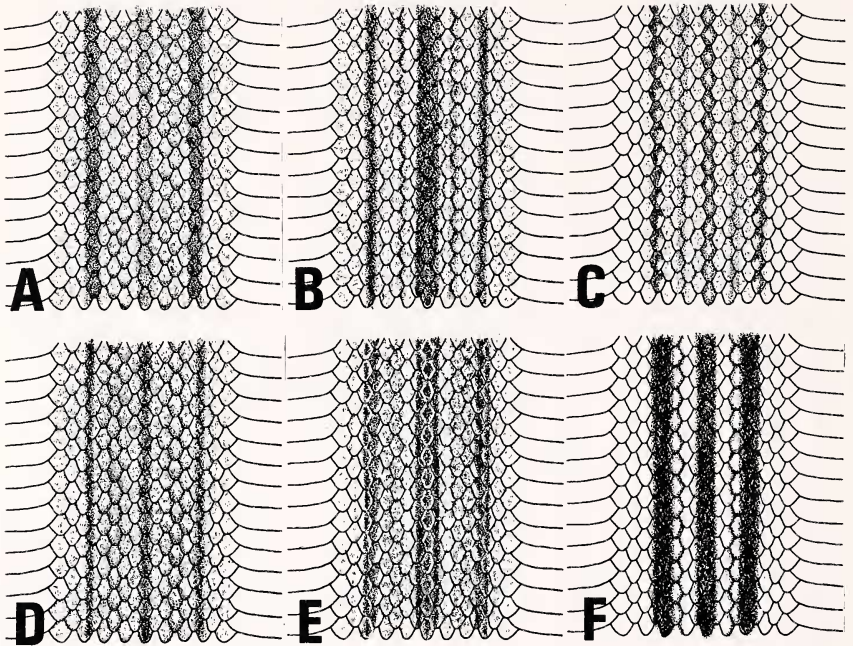


Fig. 3.—Midbody patterns of six species of *Arrhyton*; same specimens as in Fig. 2. A, *vittatum*; B, *landoi*; C, *ainictum*; D, *dolichura*; E, *tanyplectum*; F, *taeniatum*.

cisco. There are no other *Arrhyton* of any species known from Camagüey<sup>1</sup> (in which province the type-locality lies in the southeastern part) or from the adjacent portion of Oriente. All these facts have swayed us in naming this single specimen as a new species. In many ways *A. ainictum* may seem to be related to far-western *A. dolichura*, which it resembles to some extent.

*Etymology*.—The name *ainictum* is from the Greek, meaning "expressed in riddles," in allusion to the puzzle which this specimen and species presents.

#### *Arrhyton dolichura* Werner

*Arrhyton dolichurum* Werner, 1909, Mitt. Naturh. Mus. Hamburg, 26:224. *Type-locality*: "Alabama (?)" ; restricted by Grant, Smith, and Alayo, 1959, *Herpetologica*, 15:130, to La Habana, Habana Province, Cuba. *Holotype*: now destroyed; formerly in the Universität Hamburg, Zoologische Museum.

<sup>1</sup> Since this manuscript was completed, a specimen of *A. vittatum* has been collected by Lorenzo Zayas at Loma de San Martín, Sierra de Najasa, in southeastern Camagüey Province; the snake (sex undetermined) has 119 ventrals and 84 subcaudals, and a total length of 285, tail 95. The locality is about 38 km north-northwest of the type-locality of *A. ainictum*.

*Definition.*—A moderate (males to 233 mm, females to 249 mm snout-vent lengths) trilineate, neither glossy nor iridescent snake, with a slightly upturned rostral, ventrals 127 to 132 in males, 123 to 132 in females; subcaudals paired, 101 to 127 in males, 104 to 127 in females; head neither conspicuously flattened nor broad; dorsal pattern a series of three brown lines, the most lateral of which lie on scale rows 3 and 4; lined pattern not less pronounced in juveniles than in adults; ventral color cream in preservative and probably white in living individuals; ratio of tail length/total length  $\times 100$ , 40.4 to 45.8 in males, 39.6 to 44.4 in females; loreal present, bilaterally single; prefrontals two; dorsal cephalic pattern a dark brown cap of uniform intensity, vividly outlined with white, the white pigment involving the snout and the lateral margins of the brown cap from the prefrontals to the parietals, where the cap joins the median dark middorsal line which is prominent and contrasting with the brown dorsal color; a dark loreal line from the nares to the eye, and thence posteriorly across the temporals to form the dark lateral body stripes; rostral and first few supralabials flecked with dark brown on a pale to white ground; a minute but very conspicuous pair of tiny white dots paramedially, one of each side of the parietal suture at about its anterior one-third; dorsal scales somewhat more darkly edged along their posterior margins; dorsal scale rows 1 and 2 and lower portion of 3 (that is, all rows ventral to the lateral lines) white and concolor with the venter.

*Variation.*—The series of *A. dolichura* consists of seven males and five females. Maximum snout-vent length in males is 233 (IZ 1202) and in females 249 (IZ 1044). Scale counts are given in Table 1. Other counts are as follows: supralabials, always 7/7; infralabials, 8/8 (eight specimens), 8/9 (two), and 9/9 (two). Prefrontals are always two, loreals always 1/1, preoculars always 1/1, postoculars usually 2/2 (11 specimens), occasionally 1/2 (one); dorsal scale rows are 17-17-17 in 11 specimens and 17-17-15 in one.

The coloration and pattern given in the definition apply well to the entire series. The brown cap, not paler centrally, with a crisp and distinct white outlining, the whitish or pale anterior portions of the prefrontals, the trilineate body pattern, the dark posterior margins to the dorsal scales, the white parietal dots, and the pale lower scale rows below the lateral lines—all are common to the entire series. The relatively high number of subcaudals is reflected in the tail/total length ratio  $\times 100$ , which is 40.4 to 45.8 (mean = 42.7) in males, 39.6 to 44.4 (41.2) in females.

*Comparisons.*—*Arrhyton dolichura* is easily distinguished from *A. vittatum* by the higher scale counts, larger size, and different head pattern in the former. *Arrhyton landoi* and *A. dolichura* are similar in size and have similar means of ventrals in both sexes. The number of subcaudals in *A. dolichura* (111 to 127 in males, 104 to 129 in females) is greater than the number of subcaudals in *A. landoi* (71 to 111 in males, 69 to 117+ in females), although there is some overlap. The head patterns in these two species are similar except that in *A. landoi* the brown cap is lighter centrally than peripherally, and the pair of tiny white parietal dots is absent; the cap is not vividly outlined in

white in *A. landoi* as it is in *A. dolichura*. The tail/snout-vent length ratios  $\times 100$  will easily separate the two species; in males, this ratio in *A. landoi* is 30.7 to 40.1 (mean = 35.0), in *A. dolichura* 40.4 to 45.8 (43.7); in females, this ratio in *A. landoi* is 32.4 to 36.3 (34.1), in *A. dolichura* 39.6 to 44.4 (41.2).

Comparisons indicate that *A. ainictum* reaches a much larger size (male 363 snout-vent length) than *A. dolichura* (males to 233). The ventral count of the male *A. ainictum* (137) falls above the upper limit of this count in *A. dolichura* (132). The tail/total length ratio  $\times 100$  is 32.7 in *A. ainictum* and varies between 40.4 and 45.8 in *A. dolichura*. The cephalic cap in *A. ainictum*, although distinctly outlined, is not strongly contrastingly outlined as it is in *A. dolichura*. Finally, the quinquelineate pattern in *A. ainictum* does not occur in *A. dolichura*. Furthermore, the two species are separated by a distance of 650 airline kilometers.

*Distribution.*—Known only from the vicinity of La Habana, Cuba.

*Remarks.*—Although the species name was originally spelled *dolichurum*, in an apparent effort to make it of neuter gender to agree with the neuter gender of the name *Arrhyton*, such an action is incorrect. The name *dolichurum* is used as an appositional noun, not an adjective, and the Greek word for "tail" (*oura*) is feminine and must retain its feminine status under these circumstances. Accordingly we have made the orthographic change.

Certainly no other species of *Arrhyton* has had such a checkered nomenclatural history. Originally described by Werner as possibly from the state of Alabama, the name fell into disuse until 1959, when Grant et al., studying one specimen with locality data and two others (published data from the holotype and a third specimen from "Cuba" reported by Bocourt), re-instated the name. They presented a photograph of a dorsal view of the single specimen in their possession (from La Habana), but unfortunately the head of the specimen is bent downward so that the very distinctive head pattern is just barely visible and easily overlooked. Schwartz (1965) examined four specimens (one from Habana, three from Pinar del Río provinces); the latter three specimens were collected by him and were seen in life. In misreading Grant et al.'s paper, Schwartz attributed the species to Habana, Pinar del Río, and Oriente provinces; Garrido later brought to his attention that Grant et al.'s reference in their paper to the "Oriente specimen" in actuality referred to the specimen they had examined from La Habana but which was housed at that time in the Universidad de Oriente collection; thus, the species is unknown from Oriente Province, and the correction was made by Schwartz and Thomas (1975).

With the acquisition of many more specimens, it now becomes equally obvious that *A. dolichura* does not occur in Pinar del Río

Province; the three snakes called *A. dolichurum* by Schwartz are, remarkably, still another species (see below). As far as now known, *A. dolichura* has been collected only in the immediate environs of La Habana, although it surely has a broader distribution in west-central Cuba. Werner (1909) gave a total length of 410 mm and a tail length of 177 mm for the female holotype (tail/total length ratio  $\times 100$ , 43.1) and ventral and subcaudal counts of 131 and 114 (total underbody count 245); his color description agrees with the specimens here regarded as *A. dolichura* rather than with those to the west. Additionally, the ventral, subcaudal, and tail/total length ratio all fall within the known ranges for *A. dolichura* as we use the name.

*Specimens examined*.—HABANA PROV.: Reparto Atabey, La Habana (IZ 4288); Marianao, La Habana (IZ 5633); Bosque de la Habana (MLJ 2, IZ 5604, IZ 5630); El Laguito, Marianao, La Habana (IZ 1043-46, ASFS V50455); frente al Laguito, Country Club, La Habana (IZ 5633).

#### *Arrhyton tanyplectum*, new species

*Holotype*.—AMNH 77782, an adult male, from cliffs at San Vicente, Pinar del Río Province, Cuba, taken 9 July 1957 by Albert Schwartz. Original number ASFS 2661.

*Paratypes*.—AMNH 77779, Cueva de los Indios, San Vicente, Pinar del Río Province, Cuba, 18 June 1957, W. H. Gehrmann, Jr.; AMNH 81135, north base, Pan de Azúcar, 8 km E Matahambre, Pinar del Río Province, Cuba, 13 August 1958, A. García.

*Definition*.—A large (males to 306 mm, females to 265 mm snout-vent lengths) trilineate, glossy, and somewhat iridescent snake, with a slightly upturned rostral, ventrals 145 and 146 in two males, 141 in one female; subcaudals paired, 132 and 133 in males, 121 in female; head neither conspicuously flattened nor broad; dorsal pattern a series of three dark brown lines on a brown ground, the lateral lines on scale rows 3 and 4; lineate pattern equally prominent in both juveniles and adults; ventral color cream in preservative, pale yellow in living specimens; the median dorsal line continues boldly to the tip of the tail; dorsal scales dark-edged giving a rather "scaly" or "braided" appearance to the entire animal, most pronounced on the tail; ratio of tail/total length  $\times 100$ , 41.9 and 43.5 in males, 41.4 in the female; loreal present, single bilaterally; prefrontals two; head without a distinct cap, the upper surface of the head merely suffused with darker brown, this color reaching as far laterally as the loreopostocular line which is poorly defined, not separated from the dorsal head color, and concolor with it; venter immaculate, but mental scale and the first one to four infralabials with dark stippling or a blotch.

*Description of the holotype.*—An adult male, snout-vent length 306, tail length 236; body relatively long and slim and rather racer-like, head slightly broader than neck; dorsal scale rows 17-17-17; ventrals 145; subcaudals paired, 132 plus conical tip; loreal relatively large, rectangular, longer than high; preoculars 1/1, postoculars 2/2; rostral slightly upturned, tilted anteriorly; supralabials 7/7; infralabials 8/8; anterior and posterior chin shields approximately the same length, but the posterior pair pointed posteriorly, and the anterior pair parallelogrammatic. Dorsum iridescent; ground color (preserved but not appreciably different from color in life) brown with three longitudinal dark brown lines; top of head completely and rather irregularly mottled with brown and tan, but mottling not prominent; median dorsal stripe from occiput to tip of tail, involving the median and less than half of each paramedian scale row to above vent, and on tail occupying the median third of the paired paramedian scales; lateral longitudinal lines beginning at naris, proceeding across lores to eye, and then posteriorly across temporals to scale rows 3 and 4 along entire length of body; just anterior to vent, lateral stripe descends to scale rows 1 and 2 and continues to tail tip on these rows. Scales between lines brownish and on body their anterior edges darker brown; on the dorsal surface of the tail, the brown anterior edges become more prominent, and form a block-like pattern involving the longitudinal lines, and giving the appearance of a "woven" or "braided" tail. Venter virtually immaculate yellow in life, except for a few brownish punctuations on the mental scale and the first four infralabials. Hemipenis partially extruded, proximally equipped with many tiny spines, and distally with a double crown of relatively long stout spines.

*Variation.*—Scale counts for the two males and one female are shown in Table 1. Additional scutellar data are as follows: supralabials, 6/6 (one specimen) or 7/7 (two); infralabials, 8/8 (two) or 9/9 (one); prefrontals, 2; preoculars, 1/1; postoculars, 2/2; scale rows, 17-17-17. The two paratypes are (AMNH 77779) a male, snout-vent length 176, tail length 127, and (AMNH 81135) a female, snout-vent length 265, tail length 187.

The two paratypes agree in all details of coloration and pattern with the holotype. The absence of a discrete black cap, even in the small male paratypes, is pertinent and significant. The dorsal ground color was recorded as P1.15E11 in AMNH 77779 (color designation from Maerz and Paul, 1950).

*Distribution.*—Pinar del Río Province, Cuba, from Pan de Azúcar (Matahambre) in the west to San Vicente in the east.

*Comparisons.*—*Arrhyton tanyplectum* does not require comparison with *A. vittatum*, *A. landoi*, or *A. ainictum*. The dorsal pattern and absence of a head cap distinguish *A. tanyplectum*. The high number of ventrals (145 to 146 in males, 141 in female) distinguishes *A. tanyplectum* from *A. vittatum* (107 to 123 in males, 108 to 120 in females). The ventral counts of *A. tanyplectum* fall at or near the upper extremes for *A. landoi* (118 to 150 in males, 115 to 141 in females) and *A. ainictum* (137 in male). Subcaudal counts in *A. tanyplectum* (males 131 to 132, female 121) are greater than in *A. vittatum* (males 52 to 76, females 52 to 81), *A. landoi* (males 71 to 111, females 69 to 117+), or *A. ainictum* (male 108). Total underbody scales likewise are distinctive in *A. tanyplectum* (males 277 to 279, female 262), whereas these counts in *A. vittatum* are (males 155 to 198, females 165 to 195), *A. landoi* (males 191 to 252, females 184 to 239+), and *A. ainictum* (male 245). Finally, tail/total length ratios  $\times 100$  have the following means:



*A. tanyplectum* males, 42.7, female, 41.4; *A. vittatum* males (by sample), 32.0–33.7, females, 30.4–36.6; *A. landoi* males, 35.0, females, 34.1; *A. ainictum* male, 32.7.

*Arrhyton tanyplectum* requires detailed comparison with *A. dolichura*. Both are relatively large trilineate snakes; however, *A. dolichura* has a distinctly and vividly outlined cephalic cap, which is absent in even the smallest *A. tanyplectum*. We stress this fact since obliteration of the cap might be considered ontogenetic, which it is not. The two species likewise differ in number of ventral scales; *A. tanyplectum* males have 145 to 146 ventrals in contrast to 127 to 132 in *A. dolichura*, and the single female *A. tanyplectum* has 141 ventrals in contrast to 123 to 132, in female *A. dolichura*. Male *A. tanyplectum* subcaudals are 132 to 133, female 121; male *A. dolichura* 101 to 127, females 104 to 127. Total underbody scales in male *A. tanyplectum* are 277 to 279, in female 238, whereas these counts in male *A. dolichura* are 232 to 254 and in females 229 to 252. Tail/total length ratios  $\times 100$  in males of the two species have the same mean (42.7), and almost the same mean in females (41.4 in *A. tanyplectum*, 41.2 in *A. dolichura*).

Lando and Williams (1969) gave dentitional counts for one "*A. dolichurum*" (AMNH 81135, now a paratype of *A. tanyplectum*). The counts are dentary, 12; maxilla, 10 + 2; pterygoid, 8; palatine, 7.

*Etymology*.—The name *tanyplectum* is from the Greek for "in long plaits," in reference to the braided appearance of the tail.

*Remarks*.—The holotype was taken at night prowling at the base of the cliffs of a *mogote* at San Vicente; the small male paratype was taken at night in a formal garden at the base of the *mogote* in which the Cueva de los Indios lies, during a rain that had been heavy and had begun in the afternoon. The female paratype was taken among rocks at the base of cliffs, again at night, along with two specimens of the small boid *Tropidophis feicki* Schwartz; the previous afternoon had been dull and rainy. All three specimens and the circumstances under which they were collected suggest that this species is cryptic diurnally and forages above ground nocturnally, especially during and after rainy weather. The presence of cliffs and their associated talus seems to be the preferred niche occupied by *A. tanyplectum*.

Presumably *A. tanyplectum* occurs in suitable situations within the Sierra de los Organos (and also the Sierra del Rosario?) in Pinar del Río Province. That it is related to *A. dolichura* seems obvious, but there is an hiatus of about 145 airline kilometers between their known ranges.

*Arrhyton taeniatum* Günther

*Arrhyton taeniatum* Günther, 1858, *Cat. Snakes Brit. Mus.*, p. 244. *Type-locality*: Cuba.

*Holotype*: British Museum (Natural History) 1946.1.21.48 (not examined by authors).

*Colorhogia redimita* Cope, 1863, *Proc. Acad. Nat. Sci. Philadelphia*, 14:81. *Type-locality*: eastern Cuba. *Holotype*: USNM 29769 (examined by authors).

*Arrhyton fulvum* Cope, 1863, *Proc. Acad. Nat. Sci. Philadelphia*, 14:82. *Type-locality*: Cuba. *Holotype*: USNM 17421 (not examined by authors).

*Definition*.—A large (males to 396 mm, females to 448 mm snout-vent lengths) glossy snake with upturned rostral, ventrals 168 to 187 in males, 173 to 189 in females; head conspicuously flattened and broad; dorsal pattern a series of five (three dark, two paler) longitudinal lines, the median and lateral pair dark, the lateral pair on scale rows 4 to 6, or 3 to 6 (occasionally 4 and 5), this lineate pattern most conspicuous in juveniles, less so in large adults where the pale lines darken and thus render the three dark lines less distinct; ventral surface immaculate, creamy white in preserved specimens and presumably so in life; tail/total length  $\times 100$  in males 22.0 to 28.3, in females 18.4 to 29.5; loreal absent (except as in the holotype of *redimitum*); prefrontals two; dorsal cephalic pattern an irregular but symmetrical series of dark blotches involving all dorsal head scales, with a more or less distinct dark cap, separated from the postocular beginning of the dark lateral lines by a light supraocular line which expands just behind the parietals into the dorsal pale lines; supralabials usually light, but anteriormost and rostral may have dusky centers; infralabials mostly immaculate, except that mental and the first two infralabials usually have some dusky mottling or stippling, which may extend posteriorly onto the infralabials and may also involve the first pair of chin shields. Scale rows usually 17-17-17; supralabials usually 7/7, infralabials usually 8/8; one preocular and two postoculars on each side.

*Variation*.—Scale counts are shown in Table 1. We have examined 41 specimens of *A. taeniatum* from the Isla de Pinos (two), Pinar del Río (two), Habana (six), Las Villas (12), and Oriente (19); thus, although there are no specimens available from the provinces of Matanzas or Camagüey, the species appears to be islandwide in distribution. The largest male (AMNH 46885) has a snout-vent length of 396 and a tail length of 126 and is from Habana Province; the largest female (AMNH 77781) has a snout-vent length of 448 and a tail length of 137 and is from Pinar del Río Province. Other scale counts include the following: supralabials 7/7 (35 specimens), 6/7 (two), and 6/6 (one); infralabials 8/8 (27), 8/9 (14), 9/9 (six), 7/8 (one); prefrontals always 2; loreals absent (37 specimens), 1/0 (one), 1/1 (one); preoculars 1/1 (39), 1/2 (one); postoculars 2/2 (38), 1/2 (one). Dark lateral stripe on scale rows 4-6 (23), 3-6 (23), 4-5 (two); scale rows 17-17-17 (34), 19-17-17 (five), 17-17-15 (one).

There seems to be no significant geographic variation in scutellation on Isla de Pinos and Cuban snakes. Schwartz (1965) noted that the single Isla de Pinos snake available then (CM 1877) has an unusually high number of subcaudals (93), but fresh material shows that counts of 92 or more occur in males from Habana and Oriente provinces, with a maximum of 99 in an Oriente snake. Schwartz also noted that a Pinar del Río

snake (AMNH 77781) had the highest female ventral count (189); however, a Pinar del Río male (IZ 5262) has the lowest count (168) for members of this sex. Although no other females equal the high count in the Pinar del Río female, two Oriente females have counts of 187 and others in the low 180's.

The dorsal pattern likewise seems not to vary geographically. The major ontogenetic changes are involved with the intensity of the dorsal lines; these may become increasingly obscured with age until a condition (as in IZ 5594—a male, snouth-vent length 323) where they are so blurred that the five lines are distinguished only with difficulty. Although there is some variation in the scale rows involved with the dark lateral lines as noted above, row 4 is invariably involved in the lateral lines; most specimens have either three or four scale rows involved with the lateral line.

Color data on an adult male (IZ 4790—snout-vent length 369) from the Isla de Pinos, taken by the junior author, are: "a dorsal stripe or a lateral zone very bright canary yellow, which separated the white ventral color from the chestnut of the lateral stripes. Dorsum chestnut." Direct comparison of this specimen with another collected on the same date in Habana, showed the Isla de Pinos snake paler and less terracotta in color. Although we do not have ample color notes on Cuban (versus Isla de Pinos) snakes, it is possible that they differ in details of coloration, although not in pattern.

Lando and Williams (1969) gave the following dental counts on two *A. taeniatum*: dentary, 12; maxilla, 10 + 2; pterygoid, 6; palatine, 7.

*Distribution.*—Cuba, where known from the provinces of Pinar del Río, Habana, Las Villas, and Oriente; Isla de Pinos.

*Comparisons.*—*Arrhyton taeniatum* is amply distinct from all other species of *Arrhyton* on Cuba. The usual absence of a loreal scale, the tail/total length ratios  $\times 100$  (males 22.0 to 28.3, females 19.4 to 29.5), and the cephalic and dorsal patterns all serve to distinguish *A. taeniatum* from other Cuban *Arrhyton*. Additionally, its large size (males to 396, females to 448 snout-vent lengths), and high number of ventrals (males 168 to 187, females 173 to 189) serve to characterize the species.

*Remarks.*—The broad and somewhat compressed head with an up-turned rostral suggests that *A. taeniatum* is probably a burrowing snake. The latter contention has been confirmed in that the junior author found an *Amphisbaena cubana*, which is strictly fossorial, in the alimentary tract of an *A. taeniatum* from the Isla de Pinos (IZ 4790). Field notes by P. J. Darlington on MCZ 22709–10 and MCZ 22705 state that these specimens were taken under rocks in dry pasture. C. T. Ramsden recorded one specimen (IZ 5585) as collected under Guinea grass (at Santa Cecilia), and another (IZ 5591) under a clod of dry earth (San Carlos, near Guantánamo). One has the impression that *A. taeniatum* is an open (rather than forested) area snake.

*Specimens examined.*—ISLA DE PINOS: Cayo Potrero, Ciénaga de Lanier (IZ 4790); no other locality (CM 1877). PINAR DEL RÍO PROV.: San Vicente (AMNH 77781); San Diego de los Baños (IZ 5262). HABANA PROV.: "La Alianza," Cuatro Caminos (IZ 5594, IZ 5634); El Cotorro (AMNH 46684–85); Cojimar (MCZ 8507); Chávez (IZ 5609). LAS VILLAS PROV.: Soledad, Cienfuegos (MCZ 10916, MCZ 12356–57, MCZ 19874, MCZ 22705–11); Guayanaro (not mapped) (USNM 139734). ORIENTE PROV.: Holguín (IZ 5578); La Esperanza, Jiguani (IZ 5607); Barrederas (MFP 475); La Rosita de Borrero, Río Frío (ASFS V50453, IZ 5591); Santiago de Cuba (AMNH 20384); Ciudadamar, Santiago de Cuba (UIMNH 49304); nr. Universidad de Oriente, Santiago de Cuba (ASFS

V50452); Guamá (USNM 29768); Guantánamo (IZ 5575); "Santa Cecilia," Guantánamo (IZ 5585, ASFS V50454); San Carlos, Guantánamo (IZ 5575, IZ 5587-91); no locality other than "Cuba" (USNM 29769—holotype of *redimitum*).

#### DISCUSSION

As we pointed out, Lando and Williams (1969) suggested that the Cuban members of *Arrhyton* could be arranged in a series, from *A. vittatum* as the most primitive to *A. taeniatum* as the most specialized, with *A. dolichurum* and *A. landoi* between these two extremes. We agree with this contention, and the present data on the new taxa named herein confirm it. In fact, it now is possible to arrange the members of the genus in Cuba into several groups. These are, from primitive to advanced:

- I. *vittatum* group (*vittatum*, *landoi*, *ainictum*)
- II. *dolichura* group (*dolichura*, *tanyplectum*)
- III. *taeniatum* group (*taeniatum*)

I. The *vittatum* group is composed of small to large species, without strong morphological adaptations for burrowing (that is, head neither flattened nor broad, no upturned rostral), relatively low number of ventrals and subcaudals, and short tail. Some sort of dark cephalic pattern present, either indistinct or distinctly outlined with pale color; body pattern trilineate or quinquelineate. The geographic distribution is islandwide, with one species (*A. vittatum*) on the Isla de Pinos. *Arrhyton landoi* and *A. ainictum* may be interpreted as species satellite to *A. vittatum*; each of the former two species occurs in areas which seem to be unoccupied by *A. vittatum* (*A. landoi* in southern Oriente, *A. ainictum* in southeastern Camagüey).

II. The *dolichura* group contains two species; these are both restricted to extreme western and west-central Cuba; they are not highly modified for fossorial activity, are moderate to large in size, both have loreals, high numbers of ventrals and subcaudals, and long tails, their patterns are similar but *dolichura* has a well defined cephalic cap and *tanyplectum* does not.

III. The sole member of the *taeniatum* group is *A. taeniatum*. In its large size, obvious adaptations for burrowing in head form and structure, absence of a loreal, and short tail, this species is extremely distinct from all other Cuban *Arrhyton*. In fact, a case might be made for separating *taeniatum* as a distinct genus (see below). The quinquelineate pattern, although roughly similar to that of *A. ainictum*, is likewise distinctive. *Arrhyton taeniatum* is islandwide in distribution and also occurs on the Isla de Pinos.

Although the extra-Cuban species of *Arrhyton* (*callilaemus* Gosse, *funereum* Cope, *polylepis* Buden on Jamaica; *exiguum* Cope on Puerto Rico and the Virgin Islands) do not directly concern us, it is perhaps pertinent to point out certain facts concerning them and to compare

their characteristics with those of the six Cuban species (data from Buden, 1966; Schwartz, 1967; Maglio, 1970). The four extra-Cuban *Arrhyton* are moderate to large snakes (*A. exiguum* reaches a maximum snout-vent length of 418 in males and 438 in females, as large as or larger than *A. taeniatum*). All have 19-19-17 dorsal scale rows (in contrast to 17-17-17 in Cuban species). None shows an extreme adaptation for burrowing, although all are cryptic. All have short to moderately long tails, with subcaudals in males varying between 77 in *exiguum* and 122 in *callilaemus*, in females between 62 in *funereum* and 109 in *callilaemus*.

Considering primarily skeletal details, Maglio (1970) stated that "it is in *taeniatum* . . . that we find the greatest development of the trends observed in the series leading from *funereus* and *callilaemus* . . . to *vittatum* and *dolichurum* . . ." His proposed phylogeny (p. 44) of the species included in *Arrhyton* (and Hispaniolan *Darlingtonia*) is reasonable, with Jamaica having the more basic species, and Cuba, Hispaniola, and Puerto Rico the more specialized ones. This phylogenetic sequence is based upon presence or absence of scale pits, number of maxillary and palatine teeth, hemipenial structure, and presence or absence of a loreal scale. The resemblances in these characters between Hispaniolan *Darlingtonia* and Cuban *Arrhyton taeniatum* is striking; yet these two "terminal" snakes in the series do not superficially resemble each other, and the similarities are almost certainly convergent. To accommodate the four extra-Cuban species in our proposed sequence of Cuban *Arrhyton* is difficult, because the Cuban radiation is far greater and more divergent than that encompassed by all extra-Cuban species combined. We are not even certain that all snakes now included in *Arrhyton* by Maglio should be associated at the generic level; cryptic and (especially) fossorial habits demand modification of skull structure (and Maglio noted that *A. taeniatum* has the most peculiar skull of the entire lot). The extra-Cuban species would all seem to be as basic as or more primitive than the Cuban *vittatum* group. We suggest that at least *pro tem* they be regarded as another group of *Arrhyton*, the *callilaemus* group, which is more basal than the Cuban *vittatum* group.

The facts that 1) Maglio was willing to accept *Darlingtonia* on Hispaniola as a genus distinct from (but allied to) *Arrhyton*, 2) the absence of other members of the complex on Hispaniola, and 3) the resulting hiatus in the *callilaemus* group (that is, none on Hispaniola but occurring to the west on Jamaica and to the east on Puerto Rico) suggest that *taeniatum* should likewise be accorded full generic rank. Unfortunately, the evidence is in part circumstantial and inferential. Perhaps, to some biologists the fact that *taeniatum* is the type-species of *Arrhyton* makes the issue even more troublesome, because another name would have to be resurrected for the balance of the genus (*Cryptodacus*

Gundlach and Peters, 1862, has priority; *vittatus* is the type-species). We are unwilling to take such a radical step but suggest that it might be considered in the future.

As the above paragraphs indicate, there is still too little data to postulate a sound theoretical history of the genus on Cuba (or on Jamaica and Puerto Rico, if the species on those islands are indeed assignable to *Arrhyton*). It is intriguing that the least and the most specialized species in Cuba (*A. vittatum* and *A. taeniatum*) are the only ones that are islandwide and occur also on the Isla de Pinos. *Arrhyton vittatum* is generally unspecialized, whereas *A. taeniatum* is very specialized; if the former is cryptic but not strongly fossorial and the latter is strongly fossorial, this may account for the ability of these two species, one at each end of the *Arrhyton* spectrum, to be grossly sympatric. All other species have relatively limited distributions, with *A. landoi* having the most extensive range along the southern Oriente coast. Perhaps most surprising is the occurrence of the *dolichura* group only in western and west-central Cuba. The two species of this group are apparently relatively closely related and *A. tanyplectum* is associated with rocky talus and cliffs; as far as the records are concerned, *A. dolichura* is an edificarian (!) snake. Obviously, we once more know too little of the ecology of *A. dolichura*. However, the occurrence of one of these species in the Sierra de los Organos is not surprising, because this mountain range (as well as the adjacent Sierra del Rosario) has several endemic species of amphibians and reptiles.

To pursue this discussion further is futile. Although we have examined far more material of Cuban *Arrhyton* than any other workers, there are still huge hiatuses in the distributions of several of the species, and we know all too little of the ecology of most of them. Nor can we answer questions on habits or syntopy-sympatry to yield any fruitful answers. We feel, however, that we have greatly expanded the knowledge of the systematics of these rarely collected small snakes.

#### ACKNOWLEDGMENTS

The senior author's fieldwork in Cuba was under the sponsorship of two National Science Foundation grants (G-3865, G-6252). For Schwartz's previous revision of *Arrhyton*, he borrowed specimens from the following collections, to whose curators we are in debt: American Museum of Natural History (AMNH), Charles M. Bogert; Academy of Natural Sciences of Philadelphia (ANSP), James E. Bohlke; Carnegie Museum of Natural History (CM), Neil D. Richmond; Museo Felipe Poey (MFP), Universidad de la Habana, Carlos G. Aguayo; Museum of Comparative Zoology (MCZ), Ernest E. Williams and Benjamin Shreve; Museo y Biblioteca de la Habana, Miguel L. Jaume (MLJ); Museum of Zoology, University of Michigan (UMMZ), the late Norman E. Hartweg and Thomas M. Uzzell; University of Illinois Museum of Natural History (UIMNH), Hobart M. Smith; National Museum of Natural History (USNM), the late James A. Peters. Some of these same specimens have been reborrowed for the present

study, and we wish additionally to thank the following for their courtesy: Richard G. Zweifel and George W. Foley (AMNH), Clarence J. McCoy (CM), José P. Rosado (MCZ), and George R. Zug and Ronald I. Crombie (USNM). Material has been collected by the junior author, and specimens from other Cuban collections have been deposited in the Instituto de Zoología, Academia de Ciencias de Cuba (IZ) and others in the collection of the senior author (Albert Schwartz Field Series—ASFS). The senior author has had assistance in the field from Armando García, William H. Gehrmann, Jr., Richard Thomas, and Peter J. Tolson, who have collected specimens now in the AMNH and ASFS. Material in Cuban collections has been increased through the efforts of Lorenzo Zayas, Luis de Armas, and L. R. Hernández. We wish also to thank Luis Moreno and Noel González for the loans of specimens under their care.

### LITERATURE CITED

- BUDEN, D. W. 1966. An evaluation of Jamaican *Dromicus* (Serpentes, Colubridae) with the description of a new species. *Breviora*, 238:1–10.
- GRANT, C., H. M. SMITH, AND P. ALAYO DALMAU. 1959. The status of snakes of the genus *Arrhyton* in Cuba. *Herpetologica*, 15:129–133.
- LANDO, R. V., AND E. E. WILLIAMS. 1969. Notes on the herpetology of the U.S. Naval Base at Guantanamo Bay, Cuba. *Stud. Fauna Curaçao and Caribbean Is.*, 31(116):159–201.
- MAERZ, A., AND M. R. PAUL. 1950. A dictionary of color. McGraw-Hill Book Co., New York, pp. vii + 1–23, 137–208 pp.
- MAGLIO, V. J. 1970. West Indian xenodontine colubrid snakes: their probable origin, phylogeny, and zoogeography. *Bull. Mus. Comp. Zool.*, 141:1–51.
- SCHWARTZ, A. 1965. A review of the colubrid snake genus *Arrhyton* with a description of a new subspecies from southern Oriente Province, Cuba. *Proc. Biol. Soc. Washington*, 78:99–113.
- . 1967. A review of the genus *Dromicus* in Puerto Rico and the Virgin Islands. *Stahlia*, 9:1–18.
- SCHWARTZ, A., AND R. THOMAS. 1975. A check-list of West Indian amphibians and reptiles. *Spec. Publ., Carnegie Mus. Nat. Hist.* 1:1–216.
- WERNER, F. 1909. Über neue oder seltene Reptilien des Naturhistorischen Museums in Hamburg. I. Schlangen. *Mitt. Naturhist. Mus. Hamburg*, 26:205–247.

### ADDENDUM

The recent redivision of Cuban provinces into many more units than previously must be mentioned. Most American biologists concerned with Cuban geography have neither new maps nor information on the details of this division. We have, in the body of the text, used the classic political subdivisions and the map likewise shows them. However, below we give the proper and current names for the provinces; province names are in capitals, with the corresponding precise localities in lower case type, these arranged by species in the sequence discussed in the present paper.

*A. vittatum*.—ISLA DE LA JUVENTUD (Isla de Pinos); CIUDAD DE LA HABANA (La Habana, Vedado, Marianao, Cotorro, Jacomino, Lawton, Chávez, Santiago de las Vegas, Cojimar); SANCTI SPÍRITUS (San Felipe, Arroyo Blanco, Sancti Spiritus, Sierra de Jatibonico); CIENFUEGOS (Cienfuegos); VILLA CLARA (Sagua La Grande, Sitiecito); HOLGUÍN (Banes, Holguín, San Germán).

*A. landoi*.—GRANMA (Pilón); SANTIAGO DE CUBA (Palma Soriano, El Cobre, Honolosongo, Santiago de Cuba, Damayajabo, Vista Alegre, Santa María de Loreto); GUANTÁNAMO (Guantánamo, Soledad Estate, Tiguabos, Las Pailas, U.S. Naval Base, Imías).

*A. ainictum*.—LAS TUNAS (Francisco).

*A. dolichura*.—CIUDAD DE LA HABANA (Atabey, Marianao, Bosque de la Habana, El Laguito)

*A. taeniatum*.—ISLA DE LA JUVENTUD (Isla de Pinos); CIUDAD DE LA HABANA (Cuatro Caminos, El Cotorro, Cojímar, Chávez); CIENFUEGOS (Cienfuegos, Guayanara); HOLGUÍN (Holguín); GRANMA (Jiguaní); SANTIAGO DE CUBA (Río Frío, Santiago de Cuba, Ciudadamar, Guamá); GUANTÁNAMO (Guantánamo, San Carlos).

The provinces of all other localities cited are the same as those in current usage.